

Isolation and Selection of Thermo Stable Alkaline Xylanase Producing Bacteria from Corn Cob Decaying Soil

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This study focuses on the isolation of thermostable alkaline xylanase producing bacteria and xylanase production from the isolated bacteria. Bacterial strains were isolated from corn cob decaying soil. Bacterial colonies capable of hydrolyzing xylan were selected. Selected 108 bacterial colonies were purified and transferred to xylan-nutrient agar slants. Activated bacterial strains were transferred into the fermentation medium and highest xylanase producing isolates were selected. Strains CS₁ (20.6 U mL⁻¹), CS₂ (15.4 U mL⁻¹), CS₃ (11.76 U mL⁻¹) and CS₄ (11.2 U mL⁻¹) were selected for further studies. In order to select the best thermophilic and alkalophilic xylanase producing bacteria, effect of fermentation temperature and initial pH of the fermentation medium on xylanase production were studied in the range of 42-55°C and 7.0-10.0 respectively. At 45°C, strains CS₁ [132.0(±0.09)], CS₂ [120.6(±0.11)] and CS₄ [120.6(±0.44) U mL⁻¹] showed highest xylanase production at pH 8.5 while strain CS₃ [124.0(±0.01) U mL⁻¹] showed highest xylanase production at pH 8.0. Strain CS₁ produced highest xylanase activity [158.5(±0.7) U mL⁻¹] at 32h while strain CS₄ gave 117.1(±0.78) U mL⁻¹ at 20h and growth of both strains showed lag phase up to 8h and log phase up to 16h. Strain CS₁ produced lowest dry cell mass than strain CS₄ at 45°C and pH 8.5. Under stationary condition strain CS₁ and CS₄ gave highest activities of 100.6(±9.9) and 61.8(±2.2) U mL⁻¹ respectively at 48h under aeration (60-65 bubbles/min) strain CS₁ [105.2(±2.4)] and CS₄ [69.2(±3.2) U mL⁻¹] produced highest xylanase activity at 48h. When the medium was mixed in a shaker waterbath (120 rpm) xylanase activity produced by CS₁ and CS₄ were 175.6(±2.9), 79.6(±4.5) U mL⁻¹ respectively at 24 h. Therefore, CS₁ could be selected for further study under shaking in waterbath at 45°C and at the initial pH of 8.5.

Key words: Xylan, Xylanase, Thermostable and pH optimum and temperature optimum.